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Idaho Math Initiative

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Idaho Math Initiative

BACKGROUND

In 2007, the Idaho Legislature appropriated $350,000 in the FY2008 Public Schools Budget for the Idaho State Department of Education (SDE) to develop the Idaho Math Initiative, a comprehensive initiative to improve student achievement in mathematics across all grades and ensure all students graduate from high school prepared for the world that awaits them. With this seed money, Superintendent of Public Instruction Tom Luna created the Idaho Math Initiative Task Force made up of members representing teachers, principals, superintendents, school board trustees, legislators, higher education and the business community. *(See Appendix A for full list of Math Initiative Task Force members.)*

The Task Force met monthly throughout 2007 to develop a comprehensive plan for improving math education across K-12 grades and presented its final recommendations to the 2008 Legislature. Based on the Task Force's recommendations, the Legislature appropriated $3.9 million in both the FY2009 and FY2010, for the Department to implement the Idaho Math Initiative. In FY2011 and 2012, the Legislature had to reduce funding during the recession, combining the Idaho Math Initiative, Idaho Reading Initiative and ISAT Remediation funding into one line item in the Public Schools Budget, totaling $9.4 million. Each year, more than $2 million from this funding line item has continued to be dedicated to the Math Initiative. The Department allocated $2.3 million of this appropriation for the Idaho Math Initiative in FY2014.

The Idaho Math Initiative remains focused on its critical components: student achievement and teacher education. The following is an outline of how the Department has used the appropriations to implement the Idaho Math Initiative and make progress in student achievement and teacher professional development in mathematics since 2007.

STUDENT ACHIEVEMENT

Of the total budgeted for the Idaho Math Initiative, $1.155 million has focused on Student Achievement in FY2014 through a statewide contract with Think Through Math. Here is a description of activities related to Student Achievement this fiscal year.

Math Intervention:
One of the goals of the Idaho Math Initiative has been to provide Idaho teachers with the tools they need to meet the needs of every child. If a student is struggling, the student should receive immediate intervention to help bring them up to grade level. Conversely, if a student is excelling, the student should receive advanced opportunities so they can continue to excel academically. Through the Idaho Math Initiative, the State Department of Education has worked to assist schools in meet both these needs for Idaho students in mathematics. One way the Department has helped schools in this effort is by providing Think Through Math to all public schools since 2008.

Think Through Math (formerly known as Apangea Learning) is a web-based supplemental math program that provides additional support for students who are struggling, as well as opportunity for advancement for those who excel in mathematics. Think Through Math can be used in the classroom or outside the school day to help raise a student's achievement in mathematics or give them the

opportunity to excel. It provides complex mathematics problems that are aligned to Idaho's content standards in mathematics and provides access to live certified teachers if students are struggling outside the classroom. In addition, it has a motivational program built in so students earn rewards for working on math problems. Think Through Math has an Idaho-based team of Instructional Coaches who work with the classroom teacher to customize the online math instruction to the needs of each individual student. Students can access the program anywhere they have internet access – whether at home, at school or in a library.

Last school year, more than 30,000 Idaho students logged in and solved nearly 13 million complex math problems. Of those, 4 million were solved outside of the school day, in the evening or on the weekends. Already this year, 28,139 students are using Think Through Math in 74 school districts across the state. Before Christmas break, students had solved 5.1million complex math problems; of those, more than 843,000 were solved outside the school day – during evenings, weekends or over the holidays.

Think Through Math helps motivates students to do more math by creating a fun, game-like environment where students earn "Think Points" for their work, which can be redeemed for prizes or donated to a charity of their choice. During the school year, students can participate in different contests and challenges as well to accumulate more points and compete against other classrooms in the state, or across the country. In 2013, the students at Sacajawea Junior High School in Lewiston beat out 27,565 schools from across the nation to take home the Think Through March "MATH" Madness trophy. They spent 1,121 hours solving complex mathematics problems on Think Through Math, including 84 hours outside of the traditional school day.

In addition to keeping students engaged, Think Through Math continues to offer professional development to Idaho's teachers. This year, Idaho's teachers had access to a new, three-hour training program called *Integrating Think Through Math into Your Common Core State Standards Classroom*. This hands-on training program is offered onsite or online depending on each school's needs and can be customized to fit alternate schedules. The focus is on using Think Through Math effectively as part of a complete math program, in small groups, or as a whole class instructional tool. During the training teachers and administrators learn how Think Through Math supports the new Idaho Core Standards (Common Core State Standards) in mathematics and how to get the most out of the program in working directly with students.

<u>Raising Standards</u>:
Since its inception in 2008, the Idaho Math Initiative has focused on raising Idaho's academic standards in mathematics. As a state, Idaho first began with the content standards at the high school level. In 2007, Idaho raised academic standards for the high school grades for the Class of 2013 to students demonstrated not only their knowledge of mathematics but also their application of learning in each course.

In 2009, Idaho decided to look at mathematics content standards across all grade levels by joining a state-led effort, known as the Common Core State Standards Initiative, to make sure Idaho's content standards were not only college- and career-ready but also comparable with any other state in the nation or country in the world. Staff at the State Department of Education and Idaho teachers worked on the development of these standards in 2009 and 2010. The final standards were published in June 2010, and after a rigorous review process, the House and Senate Education Committees of the Idaho Legislature adopted these standards in January 2011. After adoption, these standards became known as the Idaho Core Standards. The standards were fully implemented in Idaho classrooms in the 2013-2014 school year.

Assessment:
While the Math Initiative has focused on raising academic standards, it also has worked to improve current assessments so Idaho teachers have the tools they need to better measure student progress in mathematics and guide instruction on a daily basis. In previous legislative reports, the State Department of Education has documented the state's progress in developing end-of-course assessment tools and transitioning to next-generation assessments. Here are the ways in which we have accomplished this through the Idaho Math Initiative:

End-of-Course Assessments: In Fall 2010, the State Department of Education worked with 50 math and science teachers for a week to create end-of-course assessments in six courses, including pre-algebra, algebra I, and geometry. These tools can be used not only to create end-of-course assessments, but also for benchmark or interim testing throughout the semester. The online capabilities to download or administer these assessments were initially deployed to six pilot districts through Schoolnet, the statewide instructional management system. Schoolnet assessment tools are now available to all districts and classrooms in Idaho.

Smarter Balanced Assessment: Idaho is transitioning to an improved assessment system to better measure a student's academic progress in mathematics and English language arts. Idaho is a governing state in the Smarter Balanced Assessment Consortium. As such, Idaho teachers are joining teachers in more than 20 other states to help develop an assessment that moves Idaho away from a stagnant, multiple-choice-only assessment to a new test that not only measures students' knowledge but also their abilities to think critically and problem solve. Idaho piloted this assessment in 124 schools in Spring 2013. The state will conduct a Field Test in Spring 2014. The test will be fully operational in Spring 2015. Superintendent of Public Instruction Tom Luna recently appointed the Smarter Balanced Advisory Committee made up of superintendents, principals and test coordinators to help guide the Field Test and the feedback we received from it.

Teacher resources: Additional resources in the area of assessment include a Classroom Assessment Community on an educational networking site, a webinar series on the "The Power of Assessment," both in-district and regional professional development, leadership training in the area of assessment, student focus groups on assessment, and an assessment survey that will help guide the state's future work in this area.

TEACHER EDUCATION

Of the total budgeted for the Idaho Math Initiative, $594,030 has focused on Teacher Education, which has included a professional development course and regional support. Here is a summary of the professional development provided to Idaho's teachers.

Mathematical Thinking for Instruction Course:
The Idaho Math Initiative recognizes that the most important factor in a student's academic success is the quality of the teacher in the classroom. Therefore, the Math Initiative has largely focused on offering professional development that gives Idaho teachers the tools they need to improve math education for all students. In 2007, the Idaho Math Initiative Task Force, a committee of educators under the direction of the Idaho State Department of Education, worked in partnership with the Institute of Developing Mathematical Thinking Institute at Boise State University to develop the three-credit Mathematical Thinking for Instruction (MTI) course for all Idaho teachers and school administrators involved in mathematics education. Specifically, the course provides Idaho teachers and administrators

the best practices, content knowledge, and teaching strategies they need to help all students succeed in math. *(See Appendix B for full MTI Course Descriptions.)* The course focuses on student learning by concentrating on five main ideas that are interwoven throughout the instruction: take students' ideas seriously, encourage multiple strategies, press students conceptually, address misconceptions, and focus on the structure of the mathematics. The course was developed in 2007, prior to the state's adoption of the Idaho Core Standards; however, it is well-aligned with these higher standards and prepared Idaho's teachers for this transition in mathematics.

The MTI course is similar to the comprehensive literacy course, which is required under the Idaho Reading Initiative. The Idaho State Board of Education and Idaho Legislature approved the MTI course for recertification in 2014. Select teachers and administrators were required to take only one of these courses by 2014 for recertification. Pursuant to Idaho Administrative Rule, in order to recertify, a select group of Idaho educators and administrators are required to take one of the three state-approved mathematics instruction courses titled *Mathematical Thinking for Instruction (MTI)*, prior to September 1, 2014. The following educators are required to successfully complete the course:

- Each teacher holding an Early Childhood/Early Childhood Special Education Blended Certificate (Birth - Grade 3) who is employed in an elementary classroom (multi-subject classroom, K-8);
- Each teacher holding a Standard Elementary Certificate (K-8);
- Each teacher holding a Standard Secondary Certificate (6-12) teaching in a math content classroom (grade six (6) through grade twelve (12)) including Title I classrooms;
- Each teacher holding a Standard Exceptional Child Certificate (K-12); and
- Each school administrator holding an Administrator Certificate (Pre K-12).

The State Department of Education has funded the delivery of the MTI course since 2009. To date, 12,588 teachers have completed the course. More teachers are expected to complete the course by the end of the 2013-14 school year, ensuring that all teachers required to take this course for recertification purposes will have done so by 2015. Knowing this, the Department has worked with Idaho's colleges and universities and the State Board of Education to make sure that the MTI course has now become an integral part of teacher preparation programs going forward. We no longer anticipate current teachers will need to take this three-credit course for re-certification. They will receive this critical professional development in their pre-service program before they enter the classroom.

The MTI course has been extremely successful among Idaho's teachers and better prepared them to teach the higher, more rigorous Idaho Core Standards this school year. Based on an outside evaluation of the MTI course completed by RMC Research Corporation, the state received the following findings:

- Inventories of teachers and administrators content and pedagogical knowledge consistently indicated that teacher knowledge significantly increased, and these results were highly statistically significant.
- Teachers felt more prepared to teach the entire range of topics covered in the classes.
- Participants indicated that they thought course learning was being applied in the classroom and that classroom practice was being impacted.
- It was specifically noted that the process benefits struggling learners and English language learners.

Regional Support:

Through the Idaho Math Initiative, the State Department of Education has established eight regional specialists to assist classroom teachers as they work to improve math education across grade levels. In the initial years of the Math Initiative, the regional specialists focused on teaching the Mathematical Thinking for Instruction (MTI) course. Now that the vast majority of elementary teachers, secondary

math teachers and school administrators have completed the MTI course, the regional specialists are transitioning their role to offering ongoing support to teachers at the school and classroom level, reiterating the strategies learned through the MTI course. With this support, teachers will continue to have the resources to guide classroom instruction and improve their teaching methodology in order to reach every student.

Idaho Math Initiative regional specialists are currently offering three types of support:

Workshops: Several MTI workshops were developed to continue to focus on deepening of content knowledge and the study of student thinking and work. A variety of formats were used that could accommodate workshops on Saturdays, after school or during school in-service times. All the regional math specialists developed, piloted and facilitated these workshops throughout the year. *(See Appendix C for a title and description of a sample of the MTI workshops developed.)*

Webinars: The MTI webinars are designed to support school personnel in implementing the concepts and instructional strategies from the Mathematical Thinking for Instruction (MTI) course. In addition, the webinars focus on building familiarity and understanding of the new Idaho Core Standards by examining strategies, models and contexts that support their implementation. Professional education credit is an option with webinar participation.

As-needed professional development: Regional specialists are available for local school districts on an as-needed basis as well. Teachers and school administrators can reach out to regional specialists for technical assistance throughout the school year.

The Idaho Math Initiative regional specialists also work closely with the Regional Mathematics Centers that have been established at Idaho's four-year universities to assist schools and districts with the implementation of the Idaho Core Standards in mathematics. The Department partnered with Idaho's institutions of higher education in fiscal year 2014 with funding from the Idaho Legislature to create the Idaho Regional Mathematics Centers to offer coordinated, collaborative, and comprehensive statewide support to Idaho's schools and districts as they begin to implement higher academic standards in the 2013-14 school year.

The Regional Mathematics Centers are housed within the colleges of education at Idaho State University, University of Idaho, Lewis-Clark State College, and Boise State University. Personnel at these centers work collaboratively with the Idaho State Department of Education, representatives from local industry, as well as other faculty from higher education to ensure that the best possible support can be provided to each region. They also work closely with the regional mathematics specialists to ensure we are offering cohesive support to every educator in mathematics across Idaho.

NEXT STEPS

Recognizing its success, Superintendent of Public Instruction Tom Luna has requested continued funding for the Idaho Math Initiative so the state can continue to provide a math intervention program to all Idaho students and ongoing support to Idaho's teachers at the regional level as they work to improve mathematics education across all grades.

APPENDIX A: Idaho Math Initiative Task Force Members

- Michael McGuire: Superintendent, West Bonner County School District, Priest River
- Dr. Lonnie Barber: Asst. Superintendent, Blaine County School District, Hailey
- Jan Harwood: Principal at Jefferson Elementary School in Pocatello and ICTM
- President
- Karen Echeverria: Executive Director, Idaho School Boards Association
- Kami Faylor**:** Business Representative, Micron Foundation
- Dr. Jonathan Brendefur: Math education professor, BSU
- Brenda Laws: Parent Representative, Idaho PTA
- Christina Tondevold: Contact Teacher, Idaho Distance Education Academy
- Cathy Edmonson: Elementary Teacher Representative, Lewiston School District
- Jayne Heath: High School Teacher, Council School District
- Bonnie Farmin: Director of Curriculum and Instruction, Kellogg School District
- Cindy Sisson: Curriculum Coordinator, Meridian School District
- Jennifer Quintero: Idaho Digital Learning Academy
- Rep. Steven Thayn: Legislative representative
- Christina Linder: State Department of Education staff, Director of Certification
- Cindy Johnstone: State Department of Education, Math Coordinator
- Rob Sauer: State Department of Education, Deputy Superintendent of Great Teachers and Leaders

Please note: The titles reflect the titles each person held at the time they served on the Idaho Math Initiative Task Force.

APPENDIX B: Mathematical Thinking for Instruction (MTI) Course Descriptions

Mathematical Thinking for Instruction (MTI) Course Descriptions

The MTI courses will focus on how students successfully learn math. These courses are designed to support teachers by educating them about the latest research on how children learn mathematics and how to effectively teach mathematics. Below are more detailed descriptions of each of the courses.

Mathematical Thinking for Instruction Course (MTI) Grades K-3, 3 credits. This course provides an opportunity to study fundamental mathematical theory underlying the content area of number and operation and student reasoning of number and operation topics. Topics will include child cognitive development, early numeracy, issues of number, meanings of operations and how they relate to one another, and computation within the number system as a foundation for algebra. Emphasis will be given to developing ideas of student mathematical development, increasing participants' content knowledge, and instructional practices that promote student understanding of mathematics.

Mathematical Thinking for Instruction Course (MTI) Grades 4-8, 3 credits. This course provides an opportunity to study fundamental mathematical theory underlying the content area of number and operation and student reasoning of number and operation topics. Topics will include number systems, ways of representing numbers, meanings of operations and how they relate to one another, and computation within the number system as a foundation for algebra. Emphasis will be given to developing ideas about multiplicative thinking and proportional reasoning.

Mathematical Thinking for Instruction Course (MTI) Grades 6-12, 3 credits. This course provides an opportunity to study fundamental mathematical theory underlying the content area of number and operation and structures of algebraic thinking. Topics will include working with qualitative and quantitative change and the need to describe and predict variation, the use of mathematical models and the understanding student thinking. Emphasis will be given to developing ideas about algebraic reasoning.

APPENDIX C: Mathematical Thinking for Instruction (MTI) Workshops

Title: Ratios and Proportional Reasoning (6th - 8th grade)
Description: Developing ratio and proportional reasoning is a foundational topic to the middle school curriculum and in the Common Core Standards. This workshop will focus on developing understanding of a learning progression for proportional reasoning and important considerations when selecting instructional items.

Title: Warm-Up Tasks that Build Mathematical Understanding (K-8th grade)
Description: Warm-up tasks can be used to both develop and/or remediate students understanding of number. This workshop will focus on three specific warm-up activities that can be easily implemented in the classroom and that will help build important mathematical understandings for all students.

Title: Fraction Understanding (3rd - 5th grade)
Description: Understanding of fractions is fundamental for performing operations. The workshop focuses on building the foundational ideas of unit, equivalence and comparative size of fractions through various representations.

Title: Models for Multiplication: Whole Numbers, Decimals and Percents (3rd - 6th grade) Description: Developing iconic models for multiplication is important for building students mathematical understanding. This workshop focuses on multiple models for multiplication with whole numbers, decimals & percents.

Title: Composing/Decomposing Number (K - 6 grade)
Description: Investigates the learning progression and importance of composing and decomposing numbers from whole numbers to decimals, connecting them to the operations and how they impact students' strategies.

Title: Number (K - 2 grade)
Description: Investigates students understanding of number and quantity, looking at how students develop number and strategies for instruction.

Title: Introducing Algebra (6 - 9 grade)
Description: This workshop examines methods for introducing algebraic concepts to students in a meaningful and conceptual way and how to move students towards more formal algebraic thinking and procedures. Topics include writing expressions, linear equations and systems of equations.

Title: Meaningful Assessment (4 - 10 grade)
Description: This workshop will examine how we assess students' conceptual and procedural understanding of mathematics. Topics include developing and modifying pre- and post-tests to focus on conceptual understanding and utilizing rubrics to grade student work.